

Abstract Submitted  
for the APR21 Meeting of  
The American Physical Society

**Residual Mean Field Model of Valence Quarks in the Nucleon<sup>1</sup>**

MISAK SARGSIAN, CHRISTOPHER LEON, Florida International University — We develop a non-perturbative model for valence PDFs based on the quark interactions in the mean field of the nucleonic interior. The model is based on the separation of valence 3q system from the residual system which is the source of the mean field. The PDFs are calculated within effective light-front diagrammatic approach which allows to introduce light-front valence quark and residual wave functions. The model allows us to obtain a new relation between the position of the peak of  $xq_V(x)$  distribution of the valence quark and the effective mass of the residual system,  $m_R$ :  $x_p \sim 1/4(1-m_R/m_N)$  and explains the difference in the peak positions for d- and u-quarks due to expected larger residual mass in the case of valence d- quarks We evaluated the  $Q^2$  dependence of the mass of the residual system and its effective size which gives a new insight on the effects of the QCD evolution on mean field of the nucleon. The evaluated wave functions of valence 3q- and residual systems can be used in calculations of other observables such as nucleon form factors, generalized and transverse momentum distributions.

<sup>1</sup>This work is supported by United States Department of Energy grant under contract DE-FG02-01ER41172.

Misak Sargsian  
Florida International University

Date submitted: 08 Jan 2021

Electronic form version 1.4